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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/660,138 | 09/12/2000 | Chang-Meng Hsiung | 18564005810 | 6548 |

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EXAMINER

SINES, BRIAN J

ART UNIT PAPER NUMBER

1743

DATE MAILED: 04/09/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-----------------|--------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/660,138 | HSIUNG, CHANG-MENG |
| | Examiner | Art Unit |
| | Brian J. Sines | 1743 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 21 January 2003.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) 24 and 25 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-23 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____

4) Interview Summary (PTO-413) Paper No(s) _____

5) Notice of Informal Patent Application (PTO-152)

6) Other: _____

DETAILED ACTION

Election/Restrictions

This application contains claims 24 and 25 drawn to an invention nonelected with traverse in Paper No. 6. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 19 – 21 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Regarding claim 19, the specification is unclear as to how the quality of the sensor may be monitored by assessing the uniformity of the temperature distribution in the regions, which comprise the conducting paths, of the sensor. Is a region with a more uniform temperature distribution, a higher quality sensor?

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 19 – 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. Regarding claim 19, the claim is unclear as to how the quality of the sensor may be monitored by assessing the uniformity of the temperature distribution in the regions, which comprise the conducting paths, of the sensor. Is a region with a more uniform temperature distribution, a higher quality sensor?

Claim 22 recites the limitation "said conducting paths" in line 8. There is insufficient antecedent basis for this limitation in the claim.

Claim 22 recites the limitation "said sensor array" in line 8. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 – 4, 6, 8, 12 and 14 – 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Mansky et al. (U.S. Pat. No. 6,438,497 B1). Regarding claims 1, 2 and 12, Mansky et al. teach an apparatus for materials characterization, the apparatus comprising: an array of sensors (12); and an infrared detector, such as an infrared camera, operatively associated with each sensor, wherein the infrared detector measures a response in the presence of an analyte. Regarding claim 3, through the use

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of an infrared camera for thermal imaging, it is inherently anticipated that the apparatus would further comprise a thermographic image display (see col. 1, lines 60 – 67; col. 2, lines 1 – 8; col. 12, lines 45 – 67). Regarding claim 4, Mansky et al. teach that the detector, or infrared camera, measures a matrix of responses for the sensor array (see col. 33, lines 35 – 51). Regarding claim 6, Mansky et al. teach the use of surface acoustic wave devices (see col. 37, lines 1 – 67). Regarding claim 8, Mansky et al. teach the incorporation of a computer having a resident comparison algorithm (see col. 4, lines 10 – 33). Regarding claims 14 and 15, Mansky et al. teach that the apparatus may comprise a sensor array having 400 sensors (see col. 7, lines 1 – 10). Regarding claim 16, Mansky et al. teach that the apparatus may contain different types of sensors (see col. 5, lines 31 – 49).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mansky et al. (U.S. Pat. No. 6,438,497 B1). Regarding claim 5, Mansky et al. do not specifically teach that the matrix of responses from the sensor array is a 256 x 256 array. However, Mansky et al. do teach that in a preferred embodiment, the sensor array has the same format as a standardized format used in combinatorial applications. It is well known in the art of combinatorial chemistry that large arrays of candidate compounds are screened. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the use of a 256 x 256 matrix of sensor responses, since the Courts have held that the mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Harza*, 124 USPQ 378 (CCPA 1960). Regarding claim 17, Mansky et al. do not specifically teach that the sensor array may be part of a handheld device. However, it would have been obvious to one of ordinary skill in the art to incorporate the sensor array, as taught by Mansky et al., as part of a portable, handheld device, since the Courts have held that making an old device portable is an obvious engineering design. See *In re Lindberg*, 93 USPQ 23 (CCPA 1952).

Claims 1 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewis et al. (U.S. Pat. No. 6,319,724 B1) in view of Mansky et al. (U.S. Pat. No. 6,438,497 B1). Regarding claims 1 – 3, Lewis et al. teach an apparatus comprising an array of sensors. Lewis et al. teach that the apparatus may further comprise a detector operatively associated with each sensor that provides a response in the presence of an analyte (see col. 4, lines 20 – 65). Lewis et al. do teach that the sensors in the array

may comprise infrared sensors (see col. 7, lines 6 – 24). Lewis et al. do teach analyte detection systems comprising sensor arrays, a measuring device for detecting responses across each sensor, a computer, a display, a data structure of sensor array response profiles and a comparison algorithm or comparison tables are provided (see col. 7, lines 45 – 65). Lewis et al. do not specifically teach an infrared detector operatively associated with each sensor, in which the infrared detector measures a response in the presence of an analyte. Mansky et al. do teach the use of an infrared detector, or camera, with an array of sensors. Therefore, it would have been obvious to one of ordinary skill in the art to incorporate a sensing device, such as an infrared camera, as taught by Mansky et al., with the detection apparatus comprising a sensor array, as taught by Lewis et al., in order to provide for an effective measuring means for the sensor array, as suggested by Mansky et al. Regarding claim 4, Mansky et al. teach that the infrared detector measures a matrix of responses from the sensor array (see col. 12, lines 45 – 67). Regarding claim 5, Lewis et al. teach that the sensor array may comprise up to about 10^6 sensors (see col. 7, lines 25 – 44). It would have been obvious to one of ordinary skill in the art to construct a sensor array, as taught by Lewis et al., to comprise a matrix of 256 x 256, since the Courts have held that the mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Harza*, 124 USPQ 378 (CCPA 1960). Regarding claim 6, Lewis et al. teach that the sensor array may comprise a Pd-gate MOSFET device (see col. 7, lines 6 – 24). Regarding claim 7, Lewis et al. teach that the sensor array may comprise sensors comprised of conducting and nonconducting regions (col. 7,

lines 25 – 44). Regarding claim 8, Lewis et al. teach that the apparatus may further comprise a computer having a resident comparison program or algorithm (see col. 7, lines 45 – 65). Regarding claim 9, Lewis et al. teach the use of pattern recognition algorithms, such as principle component analysis (see col. 14, lines 1 – 40). Regarding claim 10, Lewis et al. teach that the analyte may be alkanes (see col. 12, lines 20 – 32). Regarding claim 11, Lewis et al. teach that the analyte may comprise a microorganism marker gas (see col. 8, lines 12 – 65; col. 9, lines 41 – 51; col. 12, lines 39 – 45). Regarding claim 12, Lewis et al. teach that the sensor array may be used in an application such as environmental toxicology (see col. 10, lines 49 – 67, col. 11, lines 1 – 51; Table 1). Regarding claim 13, it would have been obvious to one of ordinary skill in the art to further utilize a robotic armature incorporated with the sensor array device for high throughput assay screening, since the Courts have held that to provide a mechanical or automatic means to replace manual activity, which accomplishes the same result is within the ambit of one of ordinary skill in the art. See *In re Venner*, 120 USPQ 192 (CCPA 1958). Regarding claims 14 and 15, Lewis et al. teach a sensor array comprising of 32 to 1,000 or more sensors (see col. 7, lines 25 – 44). Regarding claim 16, Lewis et al. teach that at least two sensors may be compositionally different (see col. 7, lines 36 – 44). Regarding claim 17, Lewis et al. teach that the sensor array may be apart of a handheld device (see col. 5, lines 34 – 46). Regarding claim 18, Lewis et al. teach that the fluid under analysis may be a gas, such as a breath sample (see col. 3, lines 5 – 57).

R spons to Arguments

Applicant's arguments, see page 4 of the response, filed 1/21/2003, with respect to the rejection of claims 19 – 21 under 35 U.S.C. 112, first paragraph, are not persuasive. The applicant's specification does disclose that “[i]n certain aspects, the detector output is useful as a quality control tool for identifying non-uniform hot spots in the sensor area” (see page 5, lines 13 – 20 of the applicant's specification). However, the specification does not explicitly state that the more uniform the temperature distribution in the regions, which comprise the conducting paths of the sensor, the higher the index of uniformity, *therefore* the higher the quality of the sensor (see page 5, lines 10 – 20 & page 11, line 30 – page 12 line 25 of the applicant's specification). With respect to the applicant's arguments, the applicant appears to be relying on an implied assumption, rather than an explicit disclosure, of the relationship of a more uniform temperature distribution being indicative of a higher quality sensor. The applicant is advised that the specification should contain a written description of the invention, and of the manner and process of making and using the invention, in such full, clear, concise, and exact terms so as to enable any person of ordinary skill in the art to which it pertains, or with which it is most nearly connected, to make and use the invention. The method appears to be more appropriately directed to a method of assessing the uniformity in temperature distribution in the regions, which comprise the conducting path of a sensor.

Applicant's arguments, see page 5 of the response, filed 1/21/2003, with respect to the rejection of claims 22 and 23 under 35 U.S.C. 112, first paragraph, have been

fully considered and are persuasive. The rejection of claims 22 and 23 has been withdrawn.

Applicant's arguments and amendments, see page 6 of the response, filed 1/21/2003, with respect to the rejection of claims 19 – 21 under 35 U.S.C. 112, second paragraph, are not persuasive. The applicant is advised that the claims set the meets and bounds of what the inventor considers the invention. Therefore, since the claims are specifically directed to a method for monitoring the quality of a sensor, the claims should recite the specific criteria, i.e., uniform temperature distribution, by which the "quality" of the sensor is assessed. The claim does recite that the uniformity of the temperature distribution in the regions, which comprise the conduction paths, is assessed. However, the claim does not recite how the quality of the sensor is monitored using the temperature distribution. The claim does not recite that regions having a more uniform temperature distribution is indicative of a higher quality of sensor, as discussed by the applicant (see pages 4 and 5 of the response filed 1/21/2003). Furthermore, there is no recitation of the uniformity factor or index in quantifying the quality of the sensor, as disclosed in pages 11 – 13 of the applicant's specification.

Applicant's arguments and amendments, see page 6 of the response, filed 1/21/2003, with respect to the rejection of claims 22 and 23 under 35 U.S.C. 112, second paragraph, have been fully considered and are persuasive. The rejection of claims 22 and 23 has been withdrawn.

Applicant's arguments and amendments, see page 7 of the response, filed 1/21/2003, with respect to the rejection of claims 19 and 22 under 35 U.S.C. 101 have

been fully considered and are persuasive. The rejection of claims 19 and 22 has been withdrawn.

Applicant's arguments with respect to the rejection of claims 1 – 18 under 35 U.S.C. 103(a) as being unpatentable in view of Lewis et al. in view of Mansky et al. are not persuasive. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Lewis et al. do teach that in preferred embodiments, the device further comprises a detector operatively associated with each sensor that provides a response in the presence of an analyte (see col. 4, lines 36 – 40 & col. 7, lines 45 – 65). Furthermore, in response to applicant's argument that the Lewis et al. reference, individually, does not specifically

suggest the incorporation of an *infrared detector* that is operatively associated with each sensor in the sensor array (see the second paragraph on page 8 of the response), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the *combined teachings* of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The courts have held that it is not necessary that the references actually suggest expressly or in so many words the changes or improvements that the applicant has made. The test for combining references is what the references as a whole would have suggested to one of ordinary skill in the art. See *In re Scheckler*, 168 USPQ 716 (CCPA 1971); *In re McLaughlin*, 170 USPQ 209 (CCPA 1971) & *In re Young*, 159 USPQ 725 (CCPA 1968). Lewis et al. do teach that the sensor array may comprise temperature sensors (see col. 7, lines 6 – 24 & col. 7, lines 45 – 65). The incorporation of temperature sensors implies a sensor response which includes a thermal response when the analyte is detected by the sensor array. Furthermore, Mansky et al. do specifically teach the use of an infrared camera, or detector, with a sensor array for the thermal imaging of the response of a sensor array (see col. 1, lines 60 – 67; col. 2, lines 1 – 8; & col. 12, lines 45 – 67). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate a sensing device, such as an infrared camera, as taught by Mansky et al., with the detection apparatus comprising a sensor array, as taught by Lewis et al., in order to provide for an effective measuring means for the

sensor array, as suggested by Marisky et al. The applicant's arguments with respect to the Lewis et al. reference in improving the fluid dynamic and mass transfer aspects of the operation of an artificial olfactometry device, such as with the incorporation of a vapor concentrator, are not germane to the issue of patentability under the instant rejection with regards to meeting the structural limitations of the claimed apparatus, since the claimed apparatus does not exclude these structural limitations. The applicant's arguments with respect to the Mansky et al. reference in discussing the motivation contained therein of the need for a more direct materials characterization method that involves more contact between the material sample and the sensing apparatus, are not germane to the issue of patentability under the instant obviousness rejection with regards to meeting the structural limitations of the claimed apparatus, since the claimed apparatus does not exclude these structural limitations. With respect to the applicant's arguments regarding the Mansky et al. reference, contrary to the assertions of the applicant, Mansky et al. explicitly do not teach away from the use of optical-based methods of detection. Mansky et al. explicitly state that "[t]his invention allows for property measurements that cannot be done optically. *However, optical measurements may be made in conjunction with the sensor based electronic measurements of this invention.*" (emphasis added) (see col. 3, lines 12 – 16). Mansky et al. further teach that "because there is a clear optical path to the sensors 12 from an overhead vantage point, the sensor array 10 can be used in conjunction with a camera or other optical sensing device[.]" (see col. 12, lines 45 – 67). Therefore, Mansky et al. unequivocally teach the use of optical methods for measurement and detection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines whose telephone number is (703) 305-0401. The examiner can normally be reached on Monday - Friday (11:30 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

BJS
April 7, 2003


Jill Warden
Supervisory Patent Examiner
Technology Center 1700